The FEMA National Earthquake Hazards Reduction Program

Accomplishments in Fiscal Year 2013

FEMA

Cover Photo

January 17, 1994, Northridge Earthquake, CA. Buildings, cars, and personal property were all destroyed when the earthquake struck. Approximately 114,000 residential and commercial structures were damaged and 72 deaths were attributed to the earthquake. On January 16-17, 2014, the Northridge 20 Symposium was held to commemorate the 20th anniversary of the earthquake. FEMA News Photo.

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I. Overview

The National Earthquake Hazards Reduction Program (NEHRP), which was first authorized by Congress in 1977, coordinates the earthquake-related activities of the Federal Government. The goal of NEHRP is to mitigate earthquake losses in the United States through basic and directed research and implementation activities in the fields of earthquake science and engineering.

The four NEHRP federal agencies are the Federal Emergency Management Agency (FEMA), the National Institute of Standards and Technology (NIST), which is the lead agency, the National Science Foundation (NSF), and the United States Geological Survey (USGS). Under NEHRP, FEMA is responsible for developing effective earthquake risk reduction tools and promoting their implementation, as well as supporting the development of disaster-resistant building codes and standards.

FEMA's NEHRP activities are led by the FEMA Headquarters (HQ), Federal Insurance and Mitigation Administration, Risk Reduction Division, Building Science Branch, in strong partnership with other FEMA HQ Directorates, and in coordination with the FEMA Regions, the States, the earthquake consortia, and other public and private partners.

This report describes selected FEMA NEHRP accomplishments (HQ and Regional), followed by highlights from the States and U.S. territories and organizations which received FEMA support for NEHRP activities. In Fiscal Year (FY) 2013, FEMA awarded more than $1.2 million to eligible States and territories to support the effective implementation of earthquake risk reduction activities. Organizations receiving FEMA support included the four regional earthquake consortia - Cascadia Region Earthquake Workgroup (CREW), Central United States Earthquake Consortium (CUSEC), Northeast States Emergency Consortium (NESEC), and the Western States Seismic Policy Council (WSSPC) - the Earthquake Engineering Research Institute (EERI), the Federal Alliance for Safe Homes, Inc. (FLASH), and the Southern California Earthquake Center (SCEC).

The accomplishments described in this report showcase how FEMA and its partners, working in collaboration, continued to make progress toward earthquake loss-reduction nationwide. Much of the work completed in FY 2013 is helping to reduce the earthquake risk, and is now serving as the foundation for realizing effective long-term outcomes.

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II. FEMA Headquarters and the FEMA Regions

Building Codes

There is no more important factor in reducing a community's risk from an earthquake than the adoption and enforcement of up-to-date building codes. Evaluating older buildings and retrofitting structural and non-structural components are critical steps. To survive and remain resilient, communities must also strengthen their core infrastructure and critical facilities so that these can withstand an earthquake or other disaster and continue to provide essential services. For many years, FEMA has supported seismic code development processes and promoted the adoption and enforcement of seismic codes through its participation in NEHRP.

February 20, 2014. This model house shows some aspects of earthquake retrofitting. The circle on the right shows a ceiling joist, while the left-hand circle shows another joist that can keep a home from being displaced from its concrete foundation during an earthquake. FEMA News Photo.

Support for the Code Development Process

FEMA helps to promote disaster-resilient communities through its support of national building code and standards organizations such as the International Code Council (ICC). This work is a critical part of FEMA's overall mission to help the Nation prepare for and protect against all man-made and natural hazards that pose a threat to life and property.

FEMA NEHRP supported the update of the next edition of the NEHRP Recommended Seismic Provisions for New Buildings and Other Structures, a major resource document for improvement of national building codes and standards for seismic design. Through the consensus process of the Building Seismic Safety Council (BSSC) at the National Institute of Building Science (NIBS), the Provisions Update Committee (PUC) submitted its first ballot of four change proposals for consensus approval by the BSSC membership. All four proposals were approved, including the adoption of American Society of Civil Engineers (ASCE) 7-10, its supplement and commentary as the baseline for the next NEHRP Provisions, a new chapter for simplified seismic design for seismic design category B, and new design maps for Guam and American Samoa.

This year, FEMA also successfully proposed and defended changes to the International Residential Code (IRC). At ICC Committee hearings in Dallas, Texas, in April 2013, FEMA submitted changes to the IRC for One- and Two-Family Dwellings to improve

seismic wall-bracing requirements. FEMA and other organizations also successfully testified against several changes that would have weakened the IRC. At a final hearing in October 2013, the full ICC membership approved the proposed changes.

The Branch also had a significant role in the update of ASCE 41-13, Seismic Evaluation and Retrofit of Existing Buildings. With Branch support, this update was able to combine two different standards, ASCE 31 for Seismic Evaluation and ASCE 41 for Seismic Rehabilitation, and eliminate numerous conflicts between the two previous standards.

Promoting and Monitoring the Adoption of Building Codes

FEMA promotes and monitors the adoption of building codes. By doing so, it ensures that communities are adopting disaster-resistant provisions of the building codes across the United States, resulting in local resilience and better building construction in areas prone to natural hazards.

FEMA promotes building code adoption in partnership with the ICC, standards groups, the design industry, and research institutes and through cooperative agreements with the four regional earthquake consortia, EERI, and FLASH. Building Science Branch staff also works with other FEMA programs to integrate building codes and standards in the National Flood Insurance Program and into grants policies and requirements.

FEMA uses the Building Code Effectiveness Grading Schedule, a tool owned by the Insurance Services Organization that evaluates and scores local building code departments for code adoption and enforcement for insurance credit every 5 years. FEMA has purchased the use of the data to track the rate of code adoption and report performance to FEMA, the Department of Homeland Security, and the Office of Management and Budget. In 2012, 55 percent of the jurisdictions in hazard-prone regions (earthquake, wind, and flood) adopted disaster-resistant building codes equivalent to the International Codes. By 2013, this percentage had increased to 57 percent.

National Building Safety Month

National Building Safety Month is a public awareness campaign held each May for the last 33 years. Founded by the ICC, the Building Safety Month campaign focuses on public outreach and education to increase the overall safety and sustainability of buildings through the adoption of modern building codes and the promotion of code enforcement. For the 2013 Building Safety Month, FEMA hosted community events and conducted an array of outreach activities in support of the 2013 theme, *Code Officials Keep You Safe*.

An official ICC image for Building Safety Month 2013.

A Presidential Proclamation for Building Safety Month was issued for the third time in 2013. The FEMA Building Science Branch championed the original effort for a Proclamation, which emphasized that building safety is a critical component of personal and public safety and the collective responsibility of the Nation to implement effective codes and standards to sustain safe and resilient structures. This year also provided FEMA with the opportunity to tie in Building Safety Month with annual ShakeOut earthquake drills. In May, emails were sent to all ShakeOut participants on the importance of Building Safety Month and the ShakeOut website was used for messaging on Building Safety Month activities.

New Guidance and Tools

The FEMA Building Science Branch owns the majority of the agency's publication portfolio, managing more than 250 multi-hazard publications for a variety of stakeholders, including homeowners, businesses, schools, non-profit groups, governmental and non-governmental organizations, engineering and design professionals, and building code officials. In FY 2013, more than 200,000 Branch publications were distributed to FEMA customers nationwide.

FEMA staff also published papers in conference proceedings; developed numerous flyers, web pages, guides, and fact sheets to assist State and local officials, homeowners, design and construction professionals, and the public; and authored articles in technical and industry journals. FEMA earthquake publications are made available through the FEMA Publications Warehouse and online on www.fema.gov.

In FY 2013, the FEMA Building Science Branch produced nine new or revised earthquake publications and guidance, some of which are described below.

Seismic Performance Assessment of Buildings

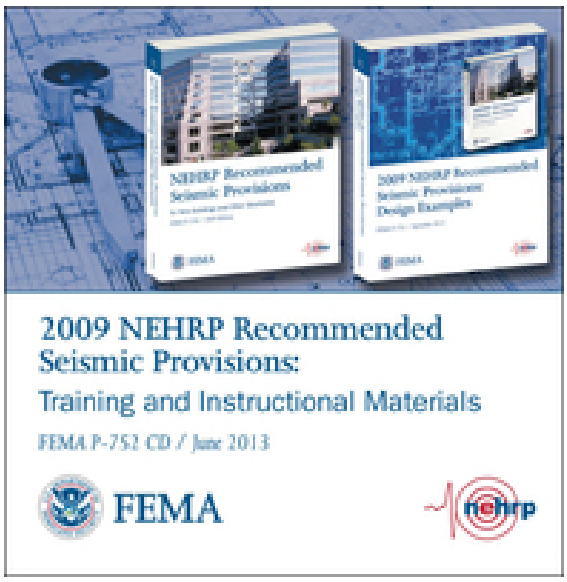
FEMA, through a contract with the Applied Technology Council (ATC), completed a multi-year project to develop a methodology for assessing how a building is likely to perform in an earthquake, given the uncertainties inherent in the potential hazard and the actual building response, and to communicate performance in ways that better relate to the decision-making needs of stakeholders. This project will permit the design of new buildings or the upgrade of existing buildings with a realistic understanding of the risk of casualties, occupancy interruption, and the economic loss that may occur as a result of future earthquakes.

The three FEMA P-58 volumes are the first phase in the development of Performance-Based Seismic Design Guidelines for New and Existing Buildings. To allow for practical implementation of the methodology, project work included the collection of fragility and consequence data for the most common structural systems and building occupancies, and the development of an electronic Performance Assessment Calculation Tool (PACT) for performing the probabilistic computations and accumulation of losses. The three volumes are FEMA P-58-1, *Seismic Performance Assessment of Buildings, Volume 1 - Methodology;* FEMA P-58-2, *Seismic Performance Assessment of Buildings, Volume 2 – Implementation Guide;* and FEMA P-58 CD, *Seismic Performance*

Assessment of Buildings, Supporting Electronic Materials and Background Documentation.

Supporting Materials for the 2009 NEHRP Recommended Seismic Provisions

One of the objectives of NEHRP is to support the development of seismic standards and building codes and to advocate for their adoption and enforcement. FEMA developed the 2009 edition of the *NEHRP Recommended Seismic Provisions for New Buildings and Other Structures* (FEMA P-750 or *Provisions)* in support of this objective. The 2009 edition was the seventh update of this key resource document published since 1985.



FEMA P-752 CD, 2009 NEHRP Recommended Seismic Provisions: Training and Instructional Materials, June 2013.

In FY 2013, FEMA completed FEMA P-752CD, *2009 NEHRP Recommended Seismic Provisions: Training and Instructional Materials.* FEMA P-752CD presents a series of PowerPoint slides and instructional materials that are aligned with the design examples in a second supporting document completed in 2012, FEMA P-751CD, *2009 NEHRP Recommended Seismic Provisions: Design Examples*. In addition to materials updated from its previous edition, FEMA P-752CD includes new units on Ground Motions, Composite/Steel Construction, Pre-Cast Design, and Seismically Isolated Structures, as well as an introduction to the latest versions of NONLIN and EQ Tools, two free software programs for the computation of dynamic response analysis of simple linear and nonlinear structures and design earthquake ground motions.

Updates to ROVER, an End-to-End Software for Managing Seismic Risk

Rapid Observation of Vulnerability and Estimation of Risk (ROVER) is a fast, free, mobile software for pre- and post-earthquake building safety screening. ROVER automates two de facto international standard paper-based seismic safety screening procedures: FEMA P-154, *Rapid Visual Screening (RVS) of Buildings for Potential Seismic Hazards,* and ATC-20, *Postearthquake Safety Evaluation of Buildings*.

ROVER's pre-earthquake module is used by field inspectors to quickly compile an electronic inventory of buildings, record important seismic features of a building, and generate an automatic estimate of the need for detailed seismic evaluation. ROVER's post-earthquake module is used to quickly perform and manage the safety tagging (red, yellow, and green tags) almost universally applied to buildings after earthquakes. ROVER has been successfully pilot tested in Salt Lake City by the Utah

Seismic Safety Commission (USSC) and the Structural Engineers Association of Utah and by the Los Angeles Unified School District.

The ROVER Server is now capable of operating as an online service for the smartphone client and as a website for direct access by any web browser. The website service has also been optimized for the small screens found on a smartphone or on any Internet-connected tablet. An updated edition of FEMA P-154 ROVER CD, *Rapid Observation of Vulnerability and Estimation of Risk*, will soon be available from the FEMA Publications Warehouse. The beta version of ROVER and an updated user manual are available from the user group ROVER Ready Alliance at www.roverready.org.

Updated Catalog of FEMA Earthquake Resources and Directory of Partners

In January 2013, FEMA published an updated *Catalog of FEMA Earthquake Resources*, FEMA P-736B and FEMA P-736B CD. The new Catalog includes an annotated list of FEMA earthquake publications along with a list of FEMA training courses and materials. The Catalog was distributed at many events in 2013, including the 2013 Structural Engineers Association of California Annual Conference and the National Earthquake Program Managers (NEPM) meeting in Seattle. The CD version of the Catalog, which is available from the FEMA Publications Warehouse along with the print version, includes PDF versions of some of the more popular FEMA publications, such as *Are You Ready*, *Earthquake Safety Guide for Homeowners,* and the *Earthquake Home Hazard Hunt* poster.

Developing and strengthening partnerships for building safer communities underlies all of the initiatives and activities carried out by FEMA in support of NEHRP. In 2013, FEMA updated its *Directory of FEMA Earthquake Partners*, an online resource that supports those partnerships by providing contact information for more than 300 organizations and individuals involved in earthquake mitigation.

Wind, Flood, and Earthquake Training Videos

Educating disaster workforces and the people who live in at-risk communities about natural hazards and the ways to mitigate risk is an important part of the FEMA mission. The new FEMA P-940CD, *Multi-Hazard Mitigation and Design Concepts: Wind, Flood, and Earthquake Training Videos*, presents three videos based on webinars abridged from the FEMA 4-day training course E312, *Fundamentals of Building Science – Multi-Hazard Mitigation and Design Concepts*. Each video explains the hazard (earthquake, wind, and flood) and the hazard-related damage, and provides users with some common sense tools to assist with specific mitigation work.

Training tools such as FEMA P-940CD support the FEMA mission and the mission of FEMA disaster-specific programs, including NEHRP. The earthquake video in

FEMA P-940CD begins with a brief introduction illustrated by a recent earthquake event. The video then discusses the hazards that can arise from seismic events, the types of earthquake damage commonly seen in the building environment, and seismic design basics. The video also discusses how buildings resist earthquakes and the seismic design process for new and existing construction. Target audiences for FEMA P-940CD are the FEMA disaster workforce, State and local community disaster mitigation, response, and recovery professionals, and people living in areas with a high risk of earthquake, flood, or wind.

Customer Satisfaction Survey Results

In 2012, a customer satisfaction survey was performed by the Department of the Interior Federal Consulting Group to assess overall customer satisfaction with the FEMA Building Science Branch's publications (the overall customer satisfaction was a very strong index score of 82, which is 15 points higher than the average for other Federal agencies). In 2013, year 2 of the survey, the study focused on 11 specific publications representing a mix of the Branch's typical technical guidance. The following are results from surveys conducted in May 2013:

- For the second year in a row, customers ordering Branch publications are very satisfied. In 2013, those who ordered at least 1 of the 11 specific publications posted a Customer Satisfaction Index (CSI) score of 84, a full 17 points above the overall government CSI score.

- Specific CSI driver scores are generally performing at exceptional levels, with customers registering very favorable perceptions of Printing and Technical Quality, Ordering Process, Technical Content, and Value.

- Satisfaction with FEMA Building Science Branch publications is high across customers of all educational levels, as well as across different types of actions taken.

Outreach and Awareness

Awareness and education campaigns, public messaging, and other outreach activities are essential tools in the FEMA mission to help the public prepare for and protect against natural disasters. FEMA conducts and supports a broad range of outreach activities for many audiences, from awareness day events and exhibits and workshops at home building supply stores to Home Hazard Hunt interactive games for kids. Each year, FEMA also exhibits and presents at numerous hazard-related conferences and expositions across the United States. Some of the FEMA NEHRP outreach programs are described below.

ShakeOut

ShakeOut, which started in Southern California in 2008, is now serving as a framework for related outreach activities. Since 2008, ShakeOut has continued to grow exponentially. In 2013, almost 19 million people participated in ShakeOut activities worldwide, including participants from 42 States and U.S. Territories. New ShakeOuts in 2013 included the Northeast ShakeOut, the Rocky Mountain ShakeOut, the American Samoa ShakeOut, the Hawaii ShakeOut, and the Grande Secousse de Charlevois, a ShakeOut for a region of Quebec Province, Canada.

ShakeOut aligns well with NEHRP goals to improve understanding of earthquake processes and impacts, develop cost-effective measures to reduce these impacts, and improve the earthquake resilience of communities nationwide. In particular, ShakeOut has become an infrastructure for providing earthquake information to the public and involving them in community resiliency. While assessing participation via registration and showcasing ShakeOut activities have been essential from the start, evaluation results to be published in 2014 will document what participants have been learning and improving in regard to preparedness and mitigation

September 5, 2013. Washington, D.C. During America's PrepareAthon!, the Great ShakeOut conducted earthquake drills encouraging participants to Drop, Cover, and Hold On. Photo by Brittany Trotter.

The success of ShakeOut is due in part to the direct financial support from FEMA NEHRP, which provides funds to the States and U.S. Territories for activities such as the development of ShakeOut websites, templates, and drill guides, registration support, and for technical planning assistance. The success of ShakeOut also is a tribute to the very active involvement and support from FEMA Preparedness, Regional Staff, the Earthquake Country Alliance (ECA), SCEC, the four regional earthquake consortia, State Earthquake Program Managers, the private sector, and many others.

Cooperative Agreements

FEMA continues to work in close partnership with the States and organizations such as EERI, FLASH, and SCEC and the four regional earthquake consortia: NESEC, CUSEC, WSSPC, and CREW. The regional consortia are long-time partners of FEMA and play an invaluable role in coordinating multi-State response and recovery planning and in public awareness, education, and outreach. The regional consortia are also very active partners in the ShakeOut earthquake drills that take place in schools, businesses, and homes across the United States.

An important focus of these cooperative agreements in FY 2013 was support to the States. FEMA is collaborating and coordinating with these grantees to ensure substantial involvement and mutual partnership in executing local and regional risk reduction outreach and implementation activities for earthquakes and other hazards. This includes earthquake mitigation planning, property inventory and seismic inspection of critical facilities, updating building codes and zoning ordinances, earthquake outreach and education, and the development of multi-State groups in support of local earthquake and other multi-hazard initiatives.

Training

FEMA is continually developing and updating training courses for its many audiences, conducting training in venues across the United States and via webinars, and sponsoring and hosting training. All told, training conducted, hosted, or sponsored by FEMA NEHRP reached about 5,000 constituents in FY 2013.

The National Earthquake Technical Assistance Program

Through the National Earthquake Technical Assistance Program (NETAP), FEMA supports training in earthquake mitigation topics at the State and local level. The courses are conducted by the ATC, under contract to FEMA, and are designed for State and local building personnel, facilities managers, and other groups.

Training topics are related to the mitigation of earthquake risk and include:

- Postearthquake Safety Evaluation of Buildings, ATC-20
- Rapid Visual Screening of Buildings for Potential Seismic Hazards, FEMA 154
- Reducing the Risks of Nonstructural Earthquake Damage, FEMA E-74
- Seismic Evaluation and Retrofit of Multi-Unit Wood Frame Buildings with Weak First Stories, FEMA P-807
- ROVER, Rapid Observation of Vulnerability and Estimation of Risk, FEMA P-154 CD, FEMA's software for pre- and post-earthquake building safety screening

October 1, 2012, Sacramento, CA. Through FEMA's NETAP, a group of emergency managers receive free technical earthquake training in FEMA's ROVER software. Photo by Jennifer Lynette.

In FY 2013, in-person training was provided through NETAP to about 4,500 people via 93 courses to 14 States and U.S. Territories.

Other Earthquake Training

FEMA also supported earthquake-related training through its State earthquake assistance program and through its cooperative agreements with the regional earthquake consortia. For example, FEMA and CUSEC offered a ROVER webinar for more than 100 participants in July 2013 in preparation for the CAPSTONE-14 exercise. In 2013, there were more than 200 participants at the FEMA-EERI Technical Seminar Series on Next Generation Seismic Ground Motion Attenuations, held in San Francisco, Los Angeles, Seattle, and Salt Lake City. States providing training with FEMA earthquake assistance funds included Utah (ROVER training) for 35 participants and Missouri (SAVE, Structural Assessment and Visual Evaluation training) for about 200 participants.

Based on FEMA P-751 and P-752, the BSSC and ASCE jointly offered a training course, Earthquake Engineering Techniques: From the NEHRP Provisions to Building Seismic Design, to more than 20 engineers and standard and code enforcement professionals in August 2013.

Regional Activities

The FEMA HQ staff works closely with their counterparts at the Regional level to support effective partnerships with the States and local communities in implementing and executing NEHRP and multi-hazard risk reduction activities. On a day-to-day basis, FEMA Regional partners support local outreach, training delivery, oversight and execution of cooperative agreements, disaster operations, and technical assistance on local projects. Their active involvement and support ensures that the NEHRP mission, building codes, standards, and other building science principles are integrated in local mitigation planning, grant decisions, and other local activities.

On April 2013, FEMA HQ and Regional staff gathered in Seattle with State earthquake program managers for the 2013 NEPM meeting. This important event, held every year, is largely a result of the commitment of FEMA NEHRP, the States, and their partners. As in previous years, the NEPM provided an excellent venue for sharing knowledge, expertise, and best practices.

FEMA Region I held a tabletop exercise and worked with the NESEC on ShakeOut. In Vermont, a State earthquake hazard map was completed and ATC-20 training was conducted. In Maine, FEMA 154 training was held and a project was conducted to assess risks for municipal buildings and incorporation of the data into HAZUS. A new awareness brochure also was developed. **FEMA Region V** work included the development of 42 new Public Service Announcements for Illinois and ATC-20 training.

FEMA Regions I through X

In **FEMA Region VI,** Arkansas, radio spots were developed as part of the Arkansas earthquake awareness campaign. The radio spots were aired on 48 radio stations with about 1 million listeners. Arkansas also continued to promote earthquake preparedness and mitigation to county leaders and business owners. **FEMA Region VII** focused on the earthquake awareness program in Missouri, including school nonstructural mitigation projects, Missouri Seismic Safety Commission school safety assessments, and the SAVE Coalition training.

In **FEMA Region IX**, the 2013 Golden Guardian Exercise was held on May 15. The Golden Guardian Exercise Series is the most comprehensive State-level exercise series in the United States. The theme was a major earthquake in the San Francisco Bay Area. Other work in **FEMA Region IX** included the All Hazards Plan; the Cascadia Subduction Zone Earthquake and Tsunami Response

Plan; NETAP training courses, the most popular of which are ATC-20, FEMA 154, and ROVER; and FEMA NEHRP projects in all of States and territories. Activities in Guam included an increased focus on outreach and education for school children, training and exercises, and the development of seismic mitigation materials.

In **FEMA Region X**, the Cascadia planning effort was wrapped up and planning work began for the exercise that will be part of the 50th anniversary of the 1964 Great Alaskan Earthquake in 2014. Other activities included NETAP training, a pilot project with the American Red Cross for a tsunami "fun run," and FEMA Risk Mapping, Assessment and Planning seismic projects, including a project in Kodiak, Alaska to inventory buildings and develop a scenario for those buildings requiring mitigation. A HAZUS Tsunami model also was developed and will be pilot tested in 2014.

III. FEMA Earthquake Assistance to the States and U.S. Territories

Region I

Maine

In 2013, Maine developed an earthquake information and safety pamphlet and participated in the 2013 ShakeOut activities. An earthquake scenario was used for the ShakeOut exercise.

Vermont

Vermont activities included continued work on the soils mapping for risk analysis project, HAZUS, and outreach to the owners of critical facilities.

Region II

New York

In FY 2013, New York incorporated earthquake risk into its mitigation planning and planning documents. Activities include the development of guidance for plan developers; the development of information on the earthquake hazard; workshops to train communities on how to develop mitigation plans and on the hazards communities should be addressing; and the development of procedures for assessing risk.

Region II Caribbean Area Division (CAD)

Puerto Rico

A primary focus in Region II CAD was the Blue Surge functional exercise held on May 21-23, 2013. The exercise, which was based on a catastrophic earthquake and tsunami in the Caribbean about 90 miles from Puerto Rico, involved the participation of State, Territorial, and Federal agency staff. The objectives for the exercise included the testing of operational coordination and communication, situational assessment, and the management of public and private resources and requests for resources.

Puerto Rico continued to be actively involved in ShakeOut activities. Activities included press releases, updates to the ShakeOut web page, and the hosting of a ShakeOut press conference with the FEMA CAD Director.

U. S. Virgin Islands

FEMA earthquake funding to the U. S. Virgin Islands was used to support and encourage participation in the Great U.S. Virgin Islands ShakeOut. Activities in FY 2013 included the development of a ShakeOut web page, press releases and media advisories, and updates to a calendar of ShakeOut related events.

Region III

The District of Columbia and States in Region III (Delaware, Maryland, Pennsylvania, Virginia, and West Virginia) did not receive earthquake assistance funds from FEMA in FY 2013. However, a number of planning, outreach, and educational activities were undertaken by Region III States.

January 20, 2012, Central VA. Homeowners should not assume their chimneys are safe without having them properly inspected following the August 2011 Earthquake. Photo by Earl Boyd.

Region IV

Alabama

Alabama used funds for HAZUS analysis of potential damage to Alabama from large magnitude earthquakes (epicenter near Fort Payne) associated with the Southern Appalachian Seismic Zone. Analysis included HAZUS injects of seismic amplification, liquefaction, and landslide susceptibility map data created with previous years FEMA funding. The results of this project were shared at the annual HAZUS conference in Indianapolis.

The Alabama Emergency Management Agency (AEMA) and the Geological Survey of Alabama (GSA) continue additional HAZUS research of effects to North Alabama from a potential large magnitude East Tennessee Seismic Zone event. AEMA and GSA met during Earthquake Awareness Month to review NEHRP project progress and continue planning for earthquake education outreach through the public schools in Alabama. Newsletters were sent to the Superintendents of Alabama for K-12 schools to develop earthquake awareness and to incorporate earthquake drills into their preparedness plan. AEMA, GSA, CUSEC, and other State and Federal partners also continued planning and preparing for the New Madrid CAPSTONE-14 earthquake exercise.

Kentucky

Activities in Kentucky focused on ShakeOut and outreach for children, including coloring book calendars and poster and writing contests in elementary schools and high schools.

Mississippi

In the months before the two ShakeOut drills, Mississippi encouraged participation through mailings, personal contacts, speaking engagements, publication updates and distribution, websites, social media, press releases, print ads, and media events. ShakeOut registrations for Mississippi were 183,625 for the February 7, 2013 ShakeOut and 226,552 for the October 17, 2013 ShakeOut. Other outreach and education included the distribution of 2,000 Earthquake Preparedness posters and 7,000 textbook covers to school districts, 2,500 magnetic pocket guides and 2,700 trifold brochures at the annual preparedness conference, and 7,000 laminated fact sheets to counties in the highest risk areas.

Mississippi partnered with CUSEC to deliver a Search and Rescue Planning workshop to more than 80 local Search and Rescue personnel. Mississippi also partnered with Tennessee Emergency Management to conduct a ShakeOut media event the week of the October ShakeOut. In addition,

Mississippi staff attended the CAPSTONE-14 Initial Planning Conference in Indianapolis.

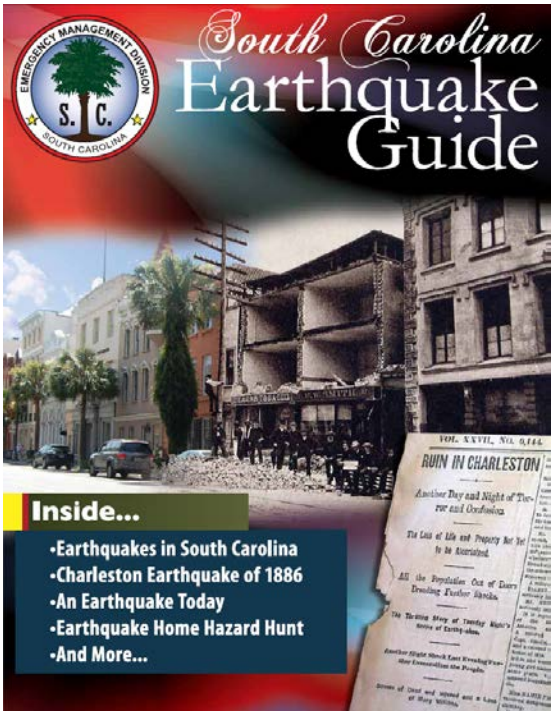
North Carolina

A series of high-impact non-structural retrofits were conducted in 2013, after the completion of non-structural projects in 2012 for the Eastern Band of Cherokee Indians, as well as Graham, Cherokee, and Swain Counties. Work in 2013 included low-cost projects for Emergency Operation Centers and police departments in Yancey County, a retrofit of the Emergency Operation Center in Buncombe County, and a unique retrofit of hazardous materials facilities on the campus of Appalachian State University. These projects resulted from close coordination between the North Carolina Division of Emergency Management's Hazard Mitigation Branch and Western Branch field office.

South Carolina

Activities in South Carolina included the update and distribution of the South Carolina Earthquake Guide, which won 1st place in the 2013 Blue Pencil and Gold Screen Award conducted by the National Association of Government Communicators for superior accomplishments in effective, creative, and innovative communications.

FEMA funds also were used for the purchase of equipment and supplies to support the ROVER Critical Asset inventory project; Shakeout coordination and collaboration, including the establishment of a SouthEast Shakeout; and partnership projects with the South Carolina Earthquake Education and Preparedness Program (SCEEP) located at the College of Charleston. The SCEEP is the outreach and educational center in South Carolina for earthquake awareness and education (http://scearthquakes.cofc.edu/).



Front cover of the South Carolina Earthquake Guide. Photo courtesy of the South Carolina Emergency Management Division Website.

Tennessee

Tennessee produced a 22-minute documentary on the geology of the New Madrid Fault and how it differs from other faults in the U.S. The documentary also discusses preparedness and mitigation issues involved in living in the Fault Zone. The documentary was shown in all major TV markets in Tennessee and was approved by National Public Television to be shown on a regular basis on all the network affiliates throughout the U.S. The documentary appeared more than 300 times and has been viewed by nearly 16 million people.

Tennessee is in the process of organizing a new group TennSAVE, similar to Missouri's

SAVE Coalition, to focus on training and other projects. In addition, earthquake exercises were held in different parts of Tennessee. The exercises are important in the event of a New Madrid earthquake because those living in Memphis will be victims and those living in mid-Tennessee and East Tennessee will need to fill the response role.

Region V

Illinois

February is Earthquake Preparedness Month in Illinois. Preparedness and awareness activities were conducted in February and throughout the year, including news releases and publication updates and distribution. Work continued on the Earthquake School Hazard Hunt, which will be completed early in 2014.

Illinois participated in the February and October 2013 ShakeOut drills. Before each ShakeOut, Illinois encouraged participation through a combination of mailings, personal contacts, websites and social media, print and radio ads, and media vents. Registrants numbered 592,616 for the February ShakeOut and 526,134 for the October ShakeOut.

Four ATC-20 courses were held in Chicago, Glenview, and O'Fallon, resulting in 189 additional trained inspectors. At year's end, Illinois had 466 trained inspectors in the CUSEC database. Architectural, engineering, and building inspection professionals from State government and the private sector continued to develop a framework for training, equipping, and deploying safety inspection teams (Illinois has assembled supplies to equip 15 teams). Teams trained under this program were deployed twice in 2013 for flooding and tornado disasters, thereby testing their deployment procedures before an earthquake event. Illinois also worked CUSEC on CAPSTONE-14 planning activities.

Indiana

Staff in Indiana participated with CUSEC on CAPSTONE-14 planning conferences, workshops, and meetings, and worked with the Indiana Building Emergency Assessment and Monitoring to train for future events. In addition, staff and the POLIS Center worked on the Indiana Earthquake Assessment for the 2014 State Mitigation Plan.

Official logo for CAPSTONE 14, a full-scale, multi-State exercise that will be held in June 2014 in support of Presidential Policy Directive (PPD)-8.

Region VI

Arkansas

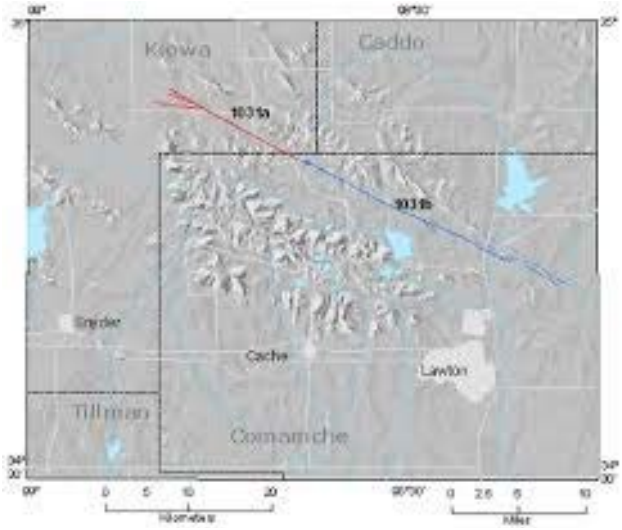
Arkansas continued to promote earthquake loss reduction practices and policies through mitigation, sponsorship of earthquake awareness and preparedness programs, and the development of better response and recovery capabilities. Arkansas sent 500 Earthquake Guide pamphlets to Clay County for Senior Preparedness Day and 30 other earthquake-related pamphlets to Arkansas State University (ASU) for an education conference. Other activities included web page updates with current events related to earthquake preparedness and mitigation

and the promotion of preparedness and mitigation measures to “at risk” county leaders and business owners. In the field of research, Arkansas is working with the ASU Science, Technology, Engineering, and Math program to provide earthquake models for their “suitcase” program, a program that provides teachers with a suitcase of teaching aids for K-12 classrooms.

Oklahoma

The Meers fault in Southwest Oklahoma may be the most pronounced fault scarp from an active Holocene fault east of the Rocky Mountains. FEMA funds were used by the Oklahoma Geological Survey (OGS) for a research project to re-evaluate the potential size of earthquakes that could occur on the Meers fault. Another focus of the research was to determine if a single recurrence interval of 5,400 years is appropriate using published literature on the Meers fault and other related geologic information. In addition to providing a report to the Oklahoma Department of Emergency Management (OEM), OGS will publish the work for inclusion in future USGS Hazard Map updates. The information will also be used by OEM in updating the State Hazard Mitigation Plan.

The Newspapers in Education (NIE) project was kicked off to coincide with the February 2013 ShakeOut campaign. New workbooks and lesson plans were distributed to participating schools and more than 500 teachers from 350 schools in 65 of the 77 Oklahoma counties participated in the NIE project. With an average of 20 to 25 students per classroom, Oklahoma was able to reach about 12,000 students and their families.



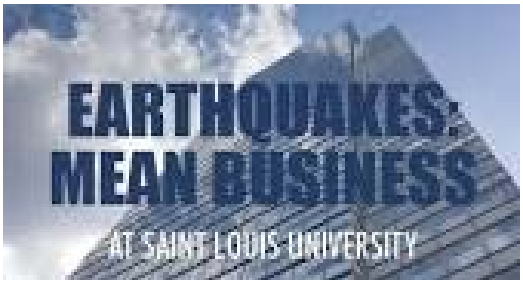
An Oklahoma map showing the location of the Meers Fault in Lawton and Kiowa Counties, OK. Map courtesy of USGS.

More than 17,000 Oklahomans participated in the February 2013 Central U.S. ShakeOut. In addition to media activities such as Twitter and Facebook messages, lesson plans were included in the Daily Oklahoman Newspaper during the ShakeOut week and magnets with Drop, Cover and Hold On instructions and emergency phone numbers were distributed. OEM also published Emergency Go-Kit Passports for families to record vital information on who lives in the home, family emergency plan information, and emergency phone numbers. The Passports, which have received very positive feedback, were distributed to local communities by local emergency managers, area coordinators, and OEM staff. Preparedness and mitigation brochures also were distributed at workshops and at the annual State conference, and the State website was updated to include earthquake preparedness tips and ShakeOut information.

Region VII

Missouri

In February, the "Earthquakes: Mean Business" Seminar for Business was held at St. Louis University. Missouri and FEMA sponsored and exhibited at the events. FEMA earthquake materials were distributed at the Earthquake Awareness Month events in Cape Girardeau and Leasburg.



The 20th Annual Earthquakes: Mean Business program was held on February 1, 2013 to raise public awareness of the earthquake hazard and risk in the Central United States.

In 2013, Missouri completed nonstructural seismic mitigation projects on Doniphan School and Nell Holcomb School. The Doniphan School Installed safety glass in the cafeteria and the Nell Holcomb School replaced gas lines with flexible connectors; secured smart board projectors with ceiling mounts; secured a vending machine, trophy cabinet, wooden bookshelves, metal cabinet, hot water heaters; laminated glass in trophy cabinets; and upgraded safety glass to the two main entryways. State assistance funds also were used to support the Missouri SAVE Coalition for training pre-earthquake and post-earthquake inspectors, to purchase supplies, and for the exercise of inspectors at disaster sites.

Outreach activities included earthquake-related displays in museums and support for the Great Central U.S ShakeOut, with activities at five schools, news releases, and appearances. Missouri also produced and distributed a new poster on earthquakes; supported the Safety Outreach Program, "Map Your Neighborhood," with training and presentations in six communities; and held another earthquake poster contest for 3rd, 4th, and 5th graders.

Region VIII

Colorado

Multi-hazard activities support earthquake project work in Colorado. FEMA NEHRP funds were used for a Statewide hazard analysis (by county) and for local hazard mitigation planning. Colorado also participated in the first 2013 Rocky Mountain ShakeOut on October 17, 2013. The ShakeOut was supported by the Colorado Earthquake Hazard Mitigation Council, which meets bi-monthly on the campus of the Colorado School of Mines.

Montana

The Montana Bureau of Mines and Geology (MBMG) used its earthquake assistance funding to make Montana's 1982-2013 earthquake catalog available as a data layer on MBMG's Online Mapping Application, providing visual, easy, and versatile access to Montana's extensive historical earthquake record. Improved access to these data—including current seismicity—will enhance Montana's earthquake and seismic hazard education and outreach efforts.

Montana also participated in its first ShakeOut on October 23, 2013. More than 107,000 Montana residents, about 10 percent of the State's population, participated in this inaugural event coordinated by the ECA, the Governor's Office of Community Service, the MBMG, the State of Montana Disaster and Emergency Services, and the American Red Cross of Montana. The buy-in and participation of local groups were critical to the success of the ShakeOut, which was featured by nearly all major TV outlets in Montana as well as in print media and radio.

Utah

In 2013, the Utah Geological Survey (UGS) and its partners, including the Utah Division of Emergency Management (UDEM), USGS, FEMA, Salt Lake County Surveyor's Office, and local cities, joined together with the Utah Automated Geographic Reference Center to acquire high-resolution 0.5-meter LiDAR for the entire Wasatch fault zone from north of Malad City, Idaho to near Fayette, Utah on the south. LiDAR coverage also will be acquired for all of Salt Lake and Utah Valleys. UGS will use these data to begin mapping Wasatch fault zone traces at a scale of approximately 1:10,000. Fault trace mapping will be used to update the *Utah Quaternary Fault Database*, USGS *Quaternary Fault and Fold Database of the United States*, and to update or create new surface-fault-rupture-hazard maps showing special study zones for development.

The UDEM held its second annual Great Utah ShakeOut drill and exercise on April 17-18, 2013. Although participation was down from the first year, schools, colleges and universities, and the business sector were well represented. After the drill, a day-long functional exercise was conducted in the State's Emergency Operations Center. The objectives of the exercise were to better utilize Utah National Guard (UNG) air and ground assets. A highlight of the exercise was a mission assignment to transport UGS geologists on an aerial reconnaissance mission flown by the UNG to look for geologic features left from the earthquake.

UDEM also is partnering with the USSC on a school building inventory project and certification of volunteer building inspector program. UDEM will provide secure storage of data collected for the project and the building data will be collected using the FEMA ROVER software.

In the 2013 session, the Utah legislature passed two significant pieces of legislation to advance the seismic safety of Utah's school buildings. One program requires that school districts requesting bond funds perform FEMA 154 RVS surveys of all buildings constructed before 1975. The second program provides for a one-time budget allocation to perform FEMA RVS on all Utah schools. Both programs anticipate using the FEMA ROVER software for data collection and evaluation.

Wyoming

HAZUS modeling is a focus of NEHRP-funded work in Wyoming, along with NETAP training. A priority was strengthening the database of critical infrastructures and lifelines with elevated seismic risk to mitigate those most at risk. Another related project involved field work by students in Jackson, Wyoming to update the database inventory. Wyoming also participated in the first Rocky Mountain ShakeOut.

Region IX

American Samoa

Activities in American Samoa focused on education, outreach, training, drills, exercises, media campaigns, and regional collaboration. Island-wide participation in the Great American Samoa ShakeOut has continued with a focus on schools and government employees. To support public outreach, education, and awareness, posters, drill manuals, and earthquake preparedness presentations were conducted and distributed during pre-ShakeOut events. "Drop, Cover, Hold On" signs, posters, and radio and newspaper advertisements were prominent throughout the year. These outreach materials explained earthquake safety tips, general seismic hazard terms, and served as a visual reminder of what to do in case an earthquake occurs. This form of earthquake mitigation and education has been a prominent tactic in public earthquake messaging in American Samoa.

Arizona

More than 116,000 Arizonans participated in the Great Arizona ShakeOut, which was an 86 percent increase from the previous year. Arizona built a new promotional campaign using ShakeOut superhero kids to engage and excite the K-12 community. This campaign, coupled with aggressive recruiting of schools, resulted in more than 84,000 K-12 students and faculty participating in ShakeOut 2013. Arizona media reporting of ShakeOut 2013 increased dramatically, with more than 50 media outlets from around the State participating. ShakeOut participation targeted high risk communities, schools, and government agencies. Regional outreach and networking also continued as ShakeOut partners and stakeholders expanded to include the Arizona Division of Emergency Management, Arizona County Emergency Management offices, American Red Cross, EarthScope, municipal emergency management offices, State agencies, and the K-12 community.

To advance earthquake knowledge, Arizona added a "Recent Earthquakes" webpage to the Arizona Geological Survey (AZGS) website to communicate on the location, timing, and magnitude of earthquakes with stakeholders such as County Emergency Managers, civil authorities, and the public. Arizona continued to use social media (Facebook, Twitter, and YouTube, among others) to reach out to stakeholders. Arizona also continued the successful AZ Shakes program, which is an outreach vehicle of the AZGS to deliver information on earthquake activity. Products developed include an "Arizona is Earthquake Country" safety guide and brochures for three counties with the greatest seismic risk.

January 18, 1994, Northridge Earthquake, CA. A home damaged by the 6.7 magnitude Northridge earthquake. FEMA News Photo.

California

The ECA is a public-private partnership of people, organizations, and regional alliances that work together to improve preparedness, mitigation, and resiliency. NEHRP funding helped to support ECA Leadership Workshops and steering committee meetings, all of which provide opportunities for leadership to collaborate in setting earthquake policy for California.

More than 9.6 million people participated in the Great California ShakeOut. California worked to fully establish ShakeOut social media, engage partner agencies, and increase recruitment support and event participation statewide, and to set the stage for increased national and international participation. ECA preparedness and mitigation messages were communicated via media to increase awareness and education. California worked with an elaborate network of partners to increase, promote, and manage public education and participation in the ShakeOut by government agencies, colleges, schools, and other organizations.

The California Critical Infrastructure Review for Seismic Vulnerabilities (Cal VIVA) project identified, evaluated, and developed basic retrofit actions for seismically vulnerable State buildings that are essential to post-earthquake response and recovery effort. The long-term goal of Cal VIVA is to help California become more disaster resilient. The most recent and second phase of the project, Cal VIVA II, has expanded the number of assessments of buildings critical to response and recovery of State functions after an earthquake. The approach is consistent with, but more detailed than FEMA 154 and ATC 20 for seismic safety inspections.

Additional projects conducted in California included: purchasing a community water tank for a town on the San Andreas Fault that will be cut off from outside access post-earthquake; supporting undergraduate internships to translate materials and conduct ShakeOut outreach; providing resources for ShakeOut and the Loma Prieta anniversary events; supporting the Southern California Earthquake Alliance and the Bay Area Earthquake Alliance; distributing handouts and preparedness supplies at awareness outreach events; and supporting disaster preparedness trainings, media coordination, and event support.

Guam

Guam's overarching goal is to ensure a seismically safe island community in consonance with the Guam Hazard Mitigation Plan. The Guam Earthquake Program has continued to adopt and promote seismic mitigation through activities such as updating building codes, zoning codes, and ordinances to enhance seismic safety. Guam also has worked to increase earthquake awareness through outreach and education and has established and participated in multi-jurisdiction groups.

The Great Guam ShakeOut was promoted by a comprehensive outreach campaign which included the production and distribution of seismic mitigation materials, including flyers, posters, TV advertisements, and radio PSAs. More than 67,000 people participated in the 2013 Great Guam ShakeOut.

Hawaii

The focus of Hawaii's Earthquake Program included the activities of the Hawaii State

Earthquake Advisory Committee (HSEAC), earthquake public outreach projects, awareness and resilience projects, and participation in the Great Hawaii ShakeOut. Hawaii's goal is to promote seismic safety, education, mitigation, and awareness throughout the islands for citizens and tourists. To accomplish this, Hawaii has partnered with members of the scientific and technical community, including universities, scientists, engineers, planners, and others in county, State, and Federal agencies.

All Hawaii residents were encouraged to participate in the Great Hawaii ShakeOut earthquake drill held at 10:17 a.m. on October 17, 2013.

The HSEAC is responsible for assisting State efforts to mitigate the impact of seismic events. Activities addressed by this committee include: review and update of the seismic portions of the State and county mitigation plans; seismic safety inspections and inventory of critical structures and lifelines; review of building codes, zoning codes, and ordinances for the purpose of enhancing seismic safety; increase earthquake awareness and education; seismic project development and program proposals; and making recommendations through the State Hazard Mitigation Forum on projects and project priorities.

Hawaii's public outreach program addresses earthquake risks by developing and disseminating outreach tools, publications, and presentations. The approach incorporates elements of outreach to the public as well as an effort to provide hazards awareness training to Hawaii's school teachers in the context of enhancement of their natural sciences curriculum. Hawaii promoted the ShakeOut and recruited more than 16,000 drill participants.

Nevada

Nevada's earthquake program has focused on automating ShakeMap input for HAZUS runs in Nevada, outreach for the Great Nevada ShakeOut, and increasing collaboration within the earthquake community by participating in committee meetings and conferences, including the Nevada Earthquake Safety Council and the National Earthquake Conference. Key partners in the program include the Nevada Division of Emergency Management, Nevada Seismological Laboratory, Nevada Bureau of Mines and Geology, Nevada Earthquake Safety Council, among other universities and agencies.

In Nevada's project work on automating ShakeMap input, comparisons have been made between different kinds of HAZUS

runs to test a spectrum of different sized earthquakes and comparisons between ShakeMap and HAZUS outputs. Discussions have continued on the running and reporting of the results of the HAZUS program in the case of a significant or damaging earthquake in or near Nevada. A template for reporting results has been produced and there is an understanding of the tasks and protocol for running and checking the program.

Participation in ShakeOut increased and included a rise in registration from all 17 school districts, multiple casinos, universities, businesses, and government agencies. In total, more than 560,000 people in Nevada participated in the earthquake drill. ShakeOut promotion included the distribution of earthquake education materials, press releases, and media events throughout the State to reinforce the messages of earthquake preparedness, response, and mitigation techniques.

Region X

Alaska

Approximately 11 percent of the world's earthquakes occur in Alaska each year, making it one of the most seismically active regions in the world. Kenai Peninsula Borough (KPB) and Matanuska-Susitna (MSB) Borough, which are home to 20 percent of Alaska's population, are the third and fourth largest State population centers. Both Boroughs sustained substantial earthquake damage from the 1964 earthquake (9.2 magnitude) and the 2002 Denali earthquake (7.9 magnitude) and continue to be at high seismic risk.

A goal for Alaska and the Alaska Seismic Hazards Safety Commission is to reduce seismic hazards in public schools. A strategy to accomplish this is to assess the seismic hazards in school structures and establish a mitigation retrofit plan for reducing them. Alaska funded a seismic hazard safety assessment and retrofit plan for KPB and Mat-Su School District which will serve as examples for earthquake risk assessment and mitigation. Selection factors for the project were the number of KPB and Mat-Su structures at risk and use of both Boroughs' schools as community shelters. The seismic assessment project will serve as a model for needed assessments in other borough and district schools in Alaska.

Alaska also increased earthquake awareness and education for the 50th Anniversary of the Good Friday Earthquake (1964). The goal is to develop, plan, and implement an earthquake and tsunami outreach campaign, culminating and extending beyond the 50th Anniversary in 2014.

Seward, AK. A police squad car lies amid the pile of wreckage following the tsunami generated by the 1964 earthquake. Photo courtesy of the Elmer E. Rasmuson Library, University of Alaska Fairbanks.

As part of the campaign, the Alaska Division of Homeland Security Preparedness and Planning Teams developed new outreach tools to showcase at different venues throughout Alaska. The tools are designed to demonstrate the effects of earthquakes and tsunamis and educate school children, citizens, and local jurisdictions on what they can do to mitigate their effects. Target outcomes are to maximize participation in the 2014 Great Alaska Shakeout by all Alaska school districts, State and local jurisdictions, businesses, and private non-profits, and to conduct outreach in as many at risk communities as possible.

Idaho

This year was the third year of Idaho's participation in ShakeOut. As part of the 2013 activities, Idaho developed a new version of the "Putting Down Roots in Earthquake Country" handbook. NETAP training focused on schools in 7 school districts and for 140 buildings.

Oregon

The City of Portland, Bureau of Development Services, has developed a new Residential Seismic Strengthening Program to help residents make their homes more secure in the next earthquake. The program is designed to reduce the likelihood of severe damage to homes as a result of displacement from the foundation or crippling of walls in an earthquake. The program provides homeowners and contractors with a simple guide to evaluate existing homes and determine if certain improvements will reduce the risk of earthquake damage.

Oregon has continually supported preparedness and outreach efforts to local communities. Oregon participates in the yearly ShakeOut exercise, with more than 160,000 Oregonians participating in the 2013 annual Drop, Cover and Hold On drill. In addition to preparedness initiatives, Oregon is working on long-term resiliency through the development of the Oregon Resiliency Plan. The Oregon Seismic Safety Policy Advisory Commission has assembled eight task groups of volunteer subject-matter experts from government, universities, the private sector, and the public to develop the portfolio of chapters that make up the Resiliency Plan.

Washington

The Washington State Earthquake Program at the Washington Emergency Management Division (WA-EMD) promotes earthquake planning, preparedness, and hazard mitigation among Washington's at-risk communities, in cooperation with FEMA and other Federal, State and local agencies, and Tribes. In 2013, Washington supported the Great ShakeOut, with more than 710,000 Washingtonians participating in the State-level Drop, Cover, and Hold On drill and other earthquake preparedness initiatives. WA-EMD will continue to support drills for citizens, schools, responders, businesses, and others to improve public safety and reduce personal vulnerability from earthquake hazards.

Washington also supported efforts to increase post-earthquake transportation functionality. As part of its bridge preservation program, the Washington Department of Transportation identifies bridges for its seismic retrofit program to minimize and avoid catastrophic bridge failures. A total of 900 bridges are part of the bridge seismic retrofit program.

IV. Regional Earthquake Consortia and FEMA Earthquake Partners

Cascadia Region Earthquake Workgroup

CREW is a coalition of private and public representatives working together to improve the ability of communities throughout the Cascadia Region (Northern California, Oregon, Washington, and British Columbia) to reduce the effects of earthquakes and related hazards, such as tsunami. Since the mid-1990s, CREW has created several publications, including scenarios, post-disaster recovery guides, and other educational materials accessible on CREW's website. CREW is composed of mostly volunteer representatives that help foster linkages between scientists, businesses, and government agencies on earthquake resiliency.

CASCADIA REGION EARTHQUAKE WORKGROUP
CREW
AHEAD OF THE WAVE

CREW, the youngest of the regional earthquake consortia, is now halfway through its 5-year strategic plan. Ongoing projects include learning forums for CREW stakeholders and the public regarding new research and technology. CREW published a major update to the Cascadia Subduction Zone Scenario that has been broadcast through the Cascadia region. CREW worked closely with a filmmaker to develop an earthquake mitigation video for a school retrofit project in Portland, Oregon.

Planned projects include additions to the CREW video shorts series on earthquake preparedness and mitigation; development of an earthquake and resilience toolkit for medium to small businesses; eNewletters geared to businesses that will provide useful preparedness and mitigation information; outreach on the updated Cascadia Subduction Zone Scenario; additional learning forums; development of a business earthquake resiliency course and national media outreach standards for Shakeout; and the continued fostering of partnerships with WSSPC, EERI, and other organizations.

Central United States Earthquake Consortium

CUSEC was established in 1983 and includes 8 member States and 10 associate States represented in FEMA Regions IV, V, VI, and VII. The CUSEC Board of Directors includes the heads of the emergency management agencies of the eight member States: Alabama, Arkansas, Illinois, Indiana, Kentucky, Missouri, Mississippi, and Tennessee. CUSEC projects in FY 2013 include public awareness and education, mitigation, response and recovery, and application of research.

CAPSTONE-14 is a good example of a planning effort in which CUSEC has strived to integrate an essential mitigation program, ATC-20/FEMA 154. Under CUSEC, building inspectors now have deployable national visibility under the Emergency Management Assistance Compact (EMAC). CUSEC and the State Earthquake Program Managers developed the required resource

typing and packaging of teams and started importing them into EMAC and Mutual Aid Support System (MASS). This initiative was carried out in partnership with Illinois FAST, Indiana I-BEAM, Missouri SAVE Coalition, Tennessee SAVE Coalition, Illinois American Institute of Architects, Illinois Capital Development Board, Tennessee Structural Engineers Association, Tennessee American Institute of Architects, and the National Emergency Management Association (NEMA). ATC-20/FEMA 154 training of inspectors has existed for at least 30 years but had never had the framework to elevate the resources in a way that made them readily accessible outside the earthquake program.

For CAPSTONE-14, there were four key areas in which elements of NEHRP and mitigation were integrated:

- EMAC
  - Addition of building inspectors as a deployable asset.

- MASS – GIS-based software that identifies resources and facilitates EMAC requests and offers for assistance.
  - Geospatial depiction of building inspector teams.

- Common Operating Picture (COP) – GIS-based software that disseminates data feeds regarding situational awareness elements from a disaster to key decision-makers.
  - Integration of USGS/State geological information, i.e., maps, situational reports.

- Building Inspector Resource Deployment (BIRD) – A program that assesses post-disaster building inspection capabilities and integrates them into EMAC.
  - Resource typing and packaging of building inspectors.

- Virtual Business Emergency Operations Center (vBEOC) – This element was developed by leveraging NEHRP concepts. It is an online platform for communication and integration with the private sector during disaster response and recovery. vBEOC, which was developed by Argonne National Laboratory in partnership with the Illinois EMA, is being tested in CAPSTONE-14 by the CUSEC Private Sector Working Group and CUSEC EMA's.

As part of the ongoing emphasis on risk reduction, CUSEC hosted an earthquake mitigation field trip through Memphis for a delegation of County Extension agents. County agents focus on rural agricultural issues, and the field trip allowed them to see the urban challenges which could have cascading impacts on rural areas.

A unique and successful outreach effort initiated by CUSEC several years ago is the Earthquake Geocache. With eight Geocache sites throughout the CUSEC States, CUSEC has continued to receive all positive feedback from visitors. CUSEC also continued its public outreach efforts. A highlight event was the work done for the Kentucky PBS affiliate KET on a program series "Kentucky Life" which focused on the New Madrid earthquakes of 1811/12 - Kentucky Life - The 1811-1812 *New Madrid Earthquakes*. The CUSEC Executive Director was a featured program guest.

A very diverse group of organizations was reached through CUSEC staff presentations and other outreach initiatives during the reporting period:

- TSA - Earthquake Workshop
- Boy Scouts Safety
- Health and Safety Fair
- Mississippi Preparedness Summit
- Sleeping Giant Earthquake Exercise – Earthquake expert
- Get Ready! Disaster Expo –Information booth
- Arkansas Governor's Earthquake Advisory Council Meeting
- Extension Disaster Education Network Conference

Earthquake Awareness month continues to offer opportunities to promote earthquake risk reduction and preparedness. Two ShakeOut events were held in 2013. This was a result of the decision to move the February event, which is traditionally earthquake awareness for the Central U.S., to October to align with other regions of the U.S. The combination of events resulted in a total of 5.3 million participants.

Northeast States Emergency Consortium

The Northeast States Emergency Consortium (NESEC) was established in 1991 and is located in Wakefield, Massachusetts. NESEC develops, promotes, and coordinates comprehensive "all-hazards" emergency management activities throughout the Northeast. This includes all phases of emergency management: preparedness, response, recovery, and mitigation. NESEC's work is a vital component to planning and response for the safety and welfare of the more than 40 million people living in the Northeast. NESEC includes the member States of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.

In 2013, NESEC published a report, "Pilot Project to Investigate the Feasibility of Using HAZUS-MH and High Resolution Satellite Imagery to Identify and Quantify Unreinforced Masonry (URM) Buildings in the United States." This project expanded upon earlier work undertaken by NESEC and demonstrates that the number and location of URM buildings at the State, regional, and national levels can be rapidly, efficiently, and cost effectively estimated using HAZUS.

The accuracy of these estimates can be further validated at the local level using parcel data, satellite imagery, and other tools. Free viewing platforms such as Google Earth provide access to this data for many more than would be otherwise possible. Easily transferable KML files can be viewed and utilized by anyone wishing to assess their area's potential risks and prepare to mitigate them. This represents the first time that a nationwide estimate of URM buildings has been computed. NESEC estimates that the number of URM buildings in the U.S. is 17,117,254. This estimated count of URM buildings is essential to establish a baseline from which progress to mitigate these dangerous buildings can be measured. The count is further broken down by FEMA Region and State. NESEC's work provides a metric that was previously not available.

The NESEC State Directors of Emergency Management and NESEC State Geologists signed a Memorandum of Understanding with the USGS for activities of mutual interest in earthquake monitoring, notification, and safety. This is the first time an agreement of this type and scope has ever been signed with the USGS and represents a major milestone in the Northeast U.S.

NESEC participated for the first time in the national and international 2013 ShakeOut. This was the first year that NESEC States organized as an official ShakeOut Region. NESEC, in partnership with FEMA, State governments, and others, coordinated recruitment across the entire region. The final numbers show that hundreds of thousands of people from across the Northeast U.S. participated in the 2013 Great Northeast ShakeOut on October 17, 2013.

Western States Seismic Policy Council

WSSPC was formed in 1979 to provide a regional and multidisciplinary forum to support and enhance seismic hazard mitigation by developing and adopting policy recommendations on seismic issues and advocating their implementation. WSSPC represents the directors of emergency management, geoscience, and seismic commissions of 13 western States, 3 U.S. Pacific Territories, a Canadian territory, and a Canadian province, for a total of 39 member agencies. WSSPC also coordinates with members of local government and building departments, insurance companies, and businesses to participate in the policy recommendation process by joining as Affiliate members. The WSSPC area in the United States alone has 85 percent of the seismic risk of the Nation and impacts more than 72 million people.

In 2013, WSSPC organized and produced a Communicating with Policy Makers Workshop with speakers from State emergency management (Alaska and Washington), American Geophysical Union, USGS, NEMA, and approximately 50 participants. The workshop was held with the NEPM meeting in Seattle and presentations were posted on the WSSPC website at www.wsspc.org.

WSSPC adopted the following six policy recommendations on building code adoption, design and remediation of new and existing school buildings, lifelines infrastructure, and tsunami evacuation and notification procedures:

- **Policy Recommendation 13-1**
  Rapid Tsunami Identification and Evacuation Notification

- **Policy Recommendation 13-4**
  Seismic Provisions in the 2012 International Building Codes

- **Policy Recommendation 13-7**
  Seismic Design of New Schools

- **Policy Recommendation 13-10**
  Joint Policy for the Evaluation and Seismic Remediation of School Buildings
- **Policy Recommendation 13-11**
  Reliability of Lifeline Infrastructure

- **Policy Recommendation 13-12**
  Earthquake Actuated Automatic Gas Shutoff Devices

WSSPC
WESTERN STATES
SEISMIC POLICY
COUNCIL

WSSPC also recognized five programs in its Awards in Excellence Program; program summaries are posted on the WSSPC website for easy transfer to other jurisdictions. Additional education and outreach was conducted through the WSSPC website, Annual Report, and quarterly newsletter.

Earthquake Engineering Research Institute

EERI is the Nation's leading technical society dedicated to the reduction of risk from earthquakes and is recognized as an authoritative voice for earthquake risk reduction information in the United States.

EERI is a national, nonprofit, multidisciplinary technical society of engineers, geoscientists, architects, planners, public officials, and social scientists. EERI is a member organization that currently has chapters throughout the U.S., including many student chapters at universities. The EERI mission is to reduce earthquake risk by (1) advancing the science and practice of earthquake engineering, (2) improving understanding of the impact of earthquakes on the physical, social, economic, political, and cultural environment, and (3) advocating comprehensive and realistic measures for reducing the harmful effects of earthquakes.

EERI Earthquake Engineering Research Institute

EERI engages in many activities to help federal agencies implement their NEHRP responsibilities. These include producing technical publications and seminars, conducting multi-disciplinary post-earthquake investigations, and providing support and hands-on learning experiences to students, among others. More information on EERI is available at www.eeri.org.

Federal Alliance for Safe Homes

FLASH entered into a cooperative agreement to assist FEMA NEHRP achieve its strategic goals and delivered a number of projects during this reporting period.

- FEMA, in partnership with FLASH, launched a nationwide campaign to put FEMA P-811DVD, QuakeSmart Toolkit, into the hands of as many small businesses as possible. FLASH continued to target outreach to umbrella-type associations such as State societies of association executives and associations serving grocers, restaurants, the lodging industry, chambers of commerce, child care providers, small private schools, and museums, among others. To provide additional incentives for the small businesses associated with the targeted associations, FLASH developed the QuakeSmart Designation program to provide business owners who complete the recommendations contained in the QuakeSmart Business Toolkit with branding materials to promote their business as being QuakeSmart. FLASH will incorporate the QuakeSmart Designation program into the expanded pilot program with State Fire Marshals to distribute the QuakeSmart Toolkit to small businesses during their annual fire inspection. FLASH continued to promote the FEMA QuakeSmart Business Toolkit to associations and small business in more than 18 States. The QuakeSmart Business Toolkit had 11,603 downloads from www.flash.org.

- FLASH continued to promote structural and nonstructural consumer resources, including three FLASH Cards: Prepare Your Family, Protect Your Home, and Protect Your Contents, which had more than 8,394 downloads from www.flash.org. FLASH also distributed more than 1,000 printed versions to States. The nonstructural "how-to" animation which helps businesses prepare employees, families, and communities for seismic events had 1,960 views.

- FLASH expanded a nonstructural assessment program to embed mitigation into annual small business fire inspections to additional cities in California.

- FLASH leveraged FEMA Building Science publications to promote consumer-focused mitigation information during National Preparedness Month. FLASH launched a Pinterest campaign which reached 50,000 individuals daily, distributed 12,000 multi-hazard mitigation FLASH Cards to support 13 preparedness town hall meetings organized by the HandsOn Network, held outreach events in 3 States that reached 405 participants, and participated in a Childcare Aware of America Association which reached 280 individuals.

FLASH®
FEDERAL ALLIANCE FOR SAFE HOMES

- In partnership with Clemson University, FLASH developed a graduate level curriculum to teach in-depth knowledge of Residential Building Codes as they pertain to the construction, civil engineering, and architectural disciplines.

- FLASH established the Texas State Collaborative (TSC) to foster State and local level relationships, with the goal of strengthening building codes and enforcement of codes. FLASH hosted the first meeting of the TSC on February 27, at which attendees identified goals and a strategic direction. The group met next on September 26 in Austin and examined Texas weather perils, building code policy, and how to collaborate with Texas leaders to achieve stronger, safer, and more sustainable buildings. FLASH is developing a Leadership Toolkit for TSC members to educate elected officials on building codes in 2014. A consumer campaign will be launched in 2015.

Southern California Earthquake Center

SCEC, headquartered at the University of Southern California, was founded in 1991 with a mission to:

- gather data on earthquakes in Southern California and elsewhere;
- integrate information into a comprehensive and physics-based understanding of earthquake phenomena; and
- communicate understanding to society at large useful knowledge for reducing earthquake risk.

An outstanding community of more than 600 scientists from 16 Core Institutions, 47 Participating Institutions, and elsewhere participate in SCEC. SCEC also partners with a large number of other research and education and outreach organizations in many disciplines.

To support this community, SCEC engages in information technology research that will revolutionize the methods for collaborative research and distributing research products on-line. In addition, the SCEC Communication, Education, and Outreach Program offers student research experiences, web-based education tools, classroom curricula, museum displays, public information brochures, online newsletters, and technical workshops and publications. Funding for SCEC activities is provided by the NSF, the USGS, and FEMA.

FEMA provides support to SCEC to manage each region's ShakeOut website, create materials, and provide other assistance. Each ShakeOut is successful when State or regional public and private partners work together to recruit participation. One reason for ShakeOut's success has been the practice of localizing content for each region, so that organizers and participants take ownership of their ShakeOut (even though all websites and materials are centrally managed). FEMA's

multidisciplinary “Whole Community” approach is essential, with customized information provided for more than 20 audience categories, including schools, families, businesses, government, nonprofit organizations, and museums.

Although ShakeOut was intended in 2008 to be held only once, requests from ShakeOut participants prompted partners and State agencies to expand the event Statewide as an annual ShakeOut drill on the third Thursday of October. Beginning in 2010 more States, territories, and countries began to join the ShakeOut, with websites replicated by SCEC in partnership with State and local agencies who recruit participants. With the involvement of many partner organizations, ShakeOut has since expanded to include 42 states and U.S. territories, plus four other countries.

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